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Original Articles

REPORT TO THE INVESTIGATING COMMITTEE UPON THE CHICAGO DRAINAGE CANAL.

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TO me was assigned the task of collecting statistical evidence of the effect of the Illinois River water upon the health of the inhabitants in the cities located upon its banks before and since the discharge of the sewage of Chicago into it. But inasmuch as no city situated upon the Illinois River uses its waters for drinking purposes, I have been unable to collect any satisfactory statistical evidence upon this point. That the putrid water pumped from the Chicago River into the Des Plaines and thence into the Illinois River produces unpleasant odors and is offensive and a nuisance to the cities below the pumping station at Bridgeport, is attested by the number of protests that have been filed against it, but that such odors are injurious to health is another question and not supported by statistical evidence from towns upon the river.

We have the evidence, however, that the inhabitants of Chicago who live and breathe the mephitic odors arising from their putrid river are shining examples of the fact that people can constantly breathe such an atmosphere and survive. Outside of the high death rate from typhoid fever and diarrheal diseases, Chicago is a remarkably healthy city. The river is apparently a source of danger only when through freshets its waters are carried far out into the lake and are pumped up into her water supply to contaminate the drinking water; which accounts for the high death rate from the diseases above cited.

The question of the opening of the Chicago Drainage Canal and the discharge of all the sewage of Chicago into the Illinois River is of such vital importance to the health interests of this community that I shall take this occasion to discuss it at the length its importance merits.

Ever since assuming the duties of Health Commissioner, I have advocated legislative action by Congress which would lead to a thorough, exhaustive and unbiased investigation of the whole question with a view of determining whether the sanitary feature of the canal could be objectionable. The Board of Health have supported me in these efforts and have willingly endorsed, at different times, resolutions recommending a speedy adoption by Congress of the Bartholdt bill for the creation of a Commission of Experts, to which the whole question could be submitted for scientific solution, whereupon Congress could act accordingly. I regret exceedingly that, notwithstanding the earnest appeals of Congressman Bartholdt, opposition has sprung up again and again from apparently interested sources to prevent the passage of this bill, and we are accordingly deprived of the protection we were expecting from this commission should it have come to the conclusion that our fears for our water supply were justified. Inasmuch as no scientific investigation has furnished us the information we seek upon this subject, we are confined to the statements and arguments presented by the advocates of the channel, and I shall endeavor to compare the essential ones with the established scientific facts, thus proving that there are grave doubts as to the reliability of some of the reasons advanced for the assumption that the sewage admitted into the canal will be diluted and purified sufficiently to render it harmless when it reaches this city.

The Chicago River is probably the most foully polluted river in the world. It has discharged into it a greater part of the sewage of Chicago, the waste water from a number of large manufacturing establishments, especially great slaughter houses built upon its banks, besides the washings from the great Chicago Stock Yards. The stream is practically stagnant and discharges itself into Lake Michigan only during heavy rain-falls when its waters rise sufficiently high to flow into the lake. The result is, that all of the organic matter which finds its way into this stream decomposes, ferments, putrefies and produces fetid odors that smell to heaven. To relieve this condition large pumps were built at Bridgeport on the south branch of the river and water lifted into the Illinois and Michigan Canal at the rate of from 30,000 to 60,000 gallons a minute, which runs thence into the Des Plaines and finally into the Illinois River. This pumping has resulted in the production of a slow current in the river towards the pumps, except during freshets when the river is flushed and discharges into

the lake. This has not relieved the river however of any of its offensiveness, so that it is to-day the concentrated essence, in fact the very quintessence, of seweral putridity. To permanently relieve the river of its burden of fetid pollution, a ditch has been dug across the watershed which separates Lake Michigan from the Mississippi Valley with the object in view of connecting the south branch of the Chicago with the Illinois River. This ditch is known as the Chicago Drainage Channel and is now nearing completion. The purpose of the canal is not only to purify the river by conducting a large volume of water from the lake through it to the Illinois River, but also to carry away all the sewage of Chicago, which is to be discharged into it. It is being constructed under the expressed conditions that 20,000 cubic feet of lake water per minute are to flow through the canal for every 100,000 population of the drainage area, at a current of not more than three miles an hour—or one and one-half gallons of water a minute, 2160 gallons* a day—are to be mixed with the sewage of every person emptied into it. The present population of the city of Chicago, according to the estimation of Health Commissioner Dr. Arthur Reynolds, is 1,650,000. This, together with the number of persons in the drainage area, whose sewage will also pass into the canal, is equal to fully 2,000,000 people.

The sewage of every person of that district amounts to 3 ounces of solid and 40 ounces of liquid excreta a day. The amount of solid excrementitious matter for 2,000,000 people would then be equal to 6,000,000 ounces, 375,000 pounds, or 187.5 tons; and of liquid excreta 80,000,000 ounces, or 670,000 gallons. We are assured that the excreta of every person of this area is to be mixed in the canal with 2160 gallons of lake water, then to mingle when it reaches the Illinois River with the large volume of water flowing there, and finally to disappear long before reaching the Mississippi River by sedimentation, oxidation, nitrification and dilution.

The question before us, however, is not whether a water fouled by these discharges may regain its pristine appearance of purity, but whether it can ever become absolutely safe for drinking purposes. One naturally asks: Is sewage-polluted water dangerous to health, and, if so, what diseases may be conveyed by it? The consensus of opinion of authorities of the world is, that sewage-polluted water is dangerous to drink, and is supported by testimony so abundant, strong and convincing as to be practically irresistible. The diseases conveyed by drinking water are: Intestinal disorders, such as diarrhea and dysentery, and typhoid fever and cholera; besides these there is a possibility of quite a number of other disease-producing bacteria, such as tuberculosis, diphtheria and anthrax, finding their way into such waters and being conveyed great distances in running streams.

The advocates of the drainage canal claim that the large volume of lake water with which the sewage of each individual of the drainage area will be mixed in the canal, together with the further dilution which will take place in the Illinois River, and the long run through its tortuous channel to the Mississippi River, will rob the sewage of its dangers and render it fit for human consumption by the time it reaches St. Louis. Attention is also called to the fact that for years the Illinois River has had pumped into it from 30,000 to 60,000 gallons of polluted Chicago River water a minute without having produced disease in the people living along the banks of the Illinois River or the inhabitants of St. Louis. It is my intention to take these arguments up in their proper order and show their fallacy.

By dilution we understand that a given quantity of sewage is mixed with water. In some cases the quantity of water used is of so large a volume that the sewage is so greatly diluted as to defy the efforts of the most skillful chemist to detect it. We are to remember, however, that the sewage, with its associated bacteria, is still there and, although beyond the skill of the chemist to detect it, is nevertheless present in sufficient quantities to afford an abundant food for bacteria.

The term of sedimentation means that the heavier particles of sewage floating in water settle upon the sides and bottom of the stream as the water flows along, and this deposition takes place more or less rapidly, according to the rate of the flowing water. The more rapid the flow, the greater the distance the sediment is carried.

Oxidation and nitrification are the result of the destructive action of bacteria upon organic matter. It is true that a part of the oxidation of organic matter in water is the direct result of a combination of the oxygen of the air dissolved in water with the organic matter, but the greater part of the oxidation is, as said before, the work of bacteria.

I find as one of the principal arguments advanced for a successful purification of the Chicago sewage after dilution with the current of water from Lake Michigan, the assertion made before the British Royal Commission in 1876 by Dr. Letheby and Prof. Tidy, that: "Sewage mixed with twenty times its volume of running water and having flowed ten or twelve miles is absolutely destroyed; the agents being infusorial animals, aquatic plants, fish and chemical oxidation."

There are not many statements in regard to the question of water pollution that have attracted more attention than this remarkable assertion. Such scientists as Dr. R. A. Smith and Sir Lyon Playfair soon assailed this sweeping conclusion as impossible.

*Computation made by T. J. Johnson, Engineer of Channel.

The former testified before the Royal Commission that: "No one has conclusively shown that it is safe to trust to dilution, storage, agitation, filtration or periods of time for the complete removal from water of disease-producing elements, whatever these may be. Chemistry and microscopy cannot and do not claim to prove the absence of these elements in any specimen of drinking water."

Dr. Lyon Playfair said: "The effect of organic matter in the water depends very much upon the character of that organic matter. If it be a mere vegetable matter, such as comes from a peaty district, even if the water originally is of a pale sherry color, on being exposed to the air in reservoirs or in canals leading from one reservoir into another, the vegetable matter gets acted upon by the air and becomes insoluble and is chiefly deposited, and what remains has no influence on health. But where the organic matter comes from drainage it is a most formidable ingredient in water, and is one of all others that ought to be looked upon with apprehension when it is from the refuse of animal matter, the drainage of large towns, the drainge of any animals, and especially of human beings."

The controversy resulting from Tidy and Letheby's assertion finally led to elaborate experiments on the question of oxidation of sewage by Dr. Frankland and others. John C. Thresh, an English authority on water supplies, gives a graphic account of these tests. The experiments were made with the Irwell and Mersey—rivers so notoriously polluted with sewage and other refuse organic matters that "ordinary aquatic life is entirely banished from their waters." They found, after making all possible corrections for dilution, etc., that in the Irwell a flow of eleven miles reduced the organic carbon by 0 to 29.6 per cent., and the organic nitrogen by 0 to 11.8 per cent. In the Mersey a flow of thirteen miles reduced the former by 0 to 20.8 per cent., and the latter by 13.2 to 17.9 per cent. Selecting the Thames as a much less polluted river, samples were taken about a quarter of a mile below where it is joined by the Kennet, and again just above the Shiplake Paper Mills. These points were selected because in the four intervening miles the river does not receive any other affluent or pollution of importance. The analytical results showed that even under very favorable circumstances the reduction in the proportion of organic matter was very small, "so minute, indeed, that, even assuming it to go on at the same rate by night and day, in sunshine and gloom, it would require a flow of seventy miles to destroy the organic matter." To exclude certain elements of uncertainty, diluted London sewage was next experimented with. It was agitated with air, and then allowed to syphon in a slender stream from one vessel to another, exposed to light, and falling each time through three feet of air. The results indicated approximately the effect of oxidation which would be produced by the flow of a stream containing 10 per cent. of sewage for 96 and 192 miles respectively at the rate of one mile per hour. By the flow of 96 miles the organic carbon was reduced by 6.4 per cent., and the organic nitrogen by 28.4 per cent., whilst the flow of 192 miles reduced the former 25.1 per cent., and the latter 33.5 per cent. Fresh urine and deep chalk-well water were next mixed together and submitted to similar treatment. Still less effect was produced; the carbon was but slightly reduced, whilst the nitrogen showed an actual increase. Finally, the results were checked by the examination of the gases dissolved in dilute sewage (5 per cent.) after standing for different periods in accurately-stoppered bottles, exposed to diffused daylight at a temperature of about 17° C. The dissolved oxygen gradually disappeared, but so slowly that "so far from sewage mixed with twenty times its volume being oxidized during a flow of ten or twelve miles, scarcely two-thirds of it would be so destroyed in a flow of 168 miles, at the rate of one mile per hour, or after the lapse of a week."

Weight of Dissolved Oxygen in 100,000 Parts of Water.

.946	Immediately After Mixture.
.803	After 24 hours.
.616	" 48 "
.315	" 96 "
.201	" 120 "
.080	" 144 "
.036	" 168 "

The Commissioners believed that it was the clarification by subsidence which takes place in nearly all rivers, which had led to the belief, so general, but erroneous, in the rapid, self-purifying power of running water.

It is not surprising that such results induced the River Pollution Commission to decide that "there is no river in the United Kingdom long enough to effect the destruction of sewage by oxidation."

Subsequent investigations made under the supervision of the Massachusetts State Board of Health on repeated outbreaks of typhoid fever in cities using polluted river waters, have served to confirm the conclusion that "no river is long enough to completely purify itself."

Discussing the question—"To what extent must a polluted liquid be diluted in order to be safely used for domestic purposes"—Prof. Wm. Ripley Nichols of Boston, an authority of high standing in sanitary science, replies in his book on Water Supplies that no answer can safely be given. He even goes so far as to discourage the discharge of sewage into streams used for water supplies, altogether, when he says: "With our present information, too much stress cannot be laid upon the importance of preventing the discharge of refuse and of sewage, in its more re-

stricted sense, into a stream or pond used, or likely to be used, as a source of water supply."

I could quote other authors like Fanning and Rideal who look upon Tidy and Letheby's assertion as an exploded theory, and who warn more or less against the discharge of sewage into streams used for water supplies; but I do not consider it necessary.

The entire argument of the Drainage Canal advocates, that dilution, such as they propose, is sufficient to purify the water, is based on the supposition that the chemical proof of the oxidation of the organic matter in the polluted canal water would establish the fact of its purification. John C. Thresh, in his exhaustive work on Water Supplies, shows how modern science has proved that dilution and purification may have taken place to such a degree that the most careful analysis can detect no element of danger, yet that the water may be practically injurious to the health, and capable of causing most serious epidemics of disease. He furthermore says: "No doubt in the course of transit from point to point much of the solid matter is deposited on the sides and bottom of the river, and some of the dissolved filth is oxidized, or otherwise destroyed; but it is open to question whether any river in this country is sufficiently long for this process of self-purification to be complete, and for the water to become absolutely free from danger."

The valuable experiments of Dr. Frankland, made under conditions securing an extraordinary quantity of oxygen by agitation and aeration, and yet only oxidizing one-third of the diluted London sewage after a flow of nearly two hundred miles, prove conclusively how slow this process of purification can be even under oxidation circumstances, far more favorable than those presented by the Drainage Canal project. Sedimentation, so essential to purification, was rendered more speedily possible by the flow of one mile per hour of the sewage water in those experiments, than it can be in the time—three miles per hour—as designated for the flow of the water in the canal. The excrementitious organic matter must necessarily be carried much farther by the more rapid flow of the canal water, thus delaying the process of purification considerable in time and distance. Thus we have to contend with the possibility of such sewage running several hundreds of miles, or more, before its purification can be considered sufficient to render it harmless.

All bacteria require food for further development and propagation, which must consist of both nitrogenous and non-nitrogenous substances in the presence of suitable heat and moisture. Sewage is such a food and the organic matter in it, as the result of the vital activity of bacteria upon it, is broken up into simple compounds, with the ultimate production of carbonic acid, ammonia and water.

The so-called nitrifying and denitrifying bacteria are found in water and are an important group of micro-organisms. The former oxidize ammonia to nitrous and nitric acid; the latter reduce nitric acid to nitrous acid and ammonia. Ultimately, then, as a result of the vital activity of bacteria, all sewage in a running stream is broken up into simpler compounds, and may be completely destroyed, providing the temperature is suitable for the growth and multiplication of bacteria, and the river long enough. Diluted sewage, free from bacteria, is not dangerous to the health of man, but it is the pathogenic bacteria in water which are to be feared. The really important question, therefore, is whether the pathogenic bacteria (notably the typhoid bacilli) are destroyed in a running stream, and, if so, how long can they survive in water before being destroyed. In regard to the deportment of the pathogenic bacteria in sewage polluted waters, a great deal of important work has been done. The consensus of opinion is that the typhoid bacillus can remain alive for from 15 to 30 days, although it is not claimed that it propagates in such waters.

The cholera spirillum has a greater vitality, living from a few days to several weeks, depending upon the saline constituents in the water.

In regard to their behavior in ice, the cholera spirillum has not the vitality of the typhoid bacillus.

Prudden found the typhoid bacillus alive after having been frozen in ice for 102 days. He also demonstrated that alternate thawing and freezing is very destructive to the organism. In the Massachusetts State Board of Health experiments, the typhoid bacillus was shown to live for 25 days in ice-cold water. These observations demonstrate that while pathogenic bacteria in water are in an unnatural medium, and probably worsted in the struggle for existence by the natural water bacteria, they still can survive and retain their virulence for quite a period of time. In concentrated putrefying sewage, both of these bacteria are destroyed in a few days.

That typhoid fever can be produced by drinking polluted water is an indisputable fact, for the instances which can be adduced in proof of it are so numerous that it is difficult to make a selection. The following examples are cited on account of their being typical outbreaks by the pollution of water in diverse manners. In some, the source of the infected material was almost self-evident; in others, the discovery of the mode by which the waters became contaminated taxed the ingenuity and patience of the investigator to the utmost, while in others specific pollution could only be inferred.

Lausen, Switzerland.—The typhoid epidemic which occurred in this village during the latter part of 1872 has been mentioned so frequently and with so much respect as to make it a classic in the epidemiology of

this disease. The circumstances were briefly as follows: A few cases of typhoid fever, occurring at a distance of one or two miles from the village, were supposed to have caused a contamination of the water of the village well, from which an infection of 130 persons, with 8 fatalities, in due time followed. From the official report of the epidemic by the health officer of Basle, it appears that a brook, passing near the premises where the original cases of typhoid occurred, was used for the washing of the linen of the patients, and at the same time as a channel for the disposal of the typhoid dejections. The course of this brook caused it to join another stream which passed through Lausen at a considerable distance below the village; but for some time it had been suspected that an underground connection existed between the brook at a place below the original location of the fever and the village well, although from surface indications any sewage discharged into the brook would pass into the larger stream below the village, and not be the cause of pollution to the village water or create an offense to its population.

After the epidemic, an investigation showed that the brook did have any underground connection with the village well; and notwithstanding the percolation of the water through a mile or more of pervious material, typhoid germs, which came into the brook from the source of the original infection, were carried into the public well, and spread the disease in the village at such an alarming rate that one in every six of the whole population was attacked. The original case of typhoid fever was held to have been imported into the neighborhood of Lausen.

A résumé of the simple facts in this instance shows:

1. No typhoid fever had been known of in Lausen for sixty years, and the general health of the people was exceptionally good.
2. During the summer of 1872, several cases of typhoid had occurred outside of the village, at a distance of a mile or more.
3. The Furlen Brook was used as a channel of discharge for the dejections of the original patients, and for the washing of their linen.
4. Salt, thrown into the brook below the original location of the disease, in due time appeared in the water of the Lausen public well.
5. The infection was limited to those who drank of the water of the public well, while families which abstained from the use of the water of this well were not affected.

The Lausen circumstance has been so well described in certain books and reports upon the subject, that it is here introduced principally to show that natural filtration, so-called, through the pervious materials or the drift, while it may render water very fair to look upon, cannot be accepted as a safeguard against typhoid infection, if the cause of infection should exist in the locality of a source of ground water supply such as was had in Lausen.

Caterham, England.—The outbreak of typhoid fever at Caterham occurred in the early part of 1879, and was reported on early in April of that year. In this instance there were upward of 100 attacks of the disease, of which 19 were fatal. It was proved beyond doubt (according to Mr. Edward Easton, Chairman of the Caterham Water Company), that the origin of the epidemic was due to the evacuations of one workman accidentally contaminating the water of the well. This workman, although suffering with a "walking" case of typhoid fever, was employed in the tunnels connecting the wells which constituted the source of water supply for Caterham and Redhill. While so employed, his frequent dejections were collected in a bucket, and from time to time hoisted out of the well. During one trip of the bucket an accident occurred, causing a portion of its contents to be spilled into the water; and from this in due time grew an epidemic of typhoid fever, alarming in proportion to the population of the district supplied from this source.

The circumstances of the affair are revolting in the extreme; and how a person suffering with the early symptoms of typhoid could be permitted to follow his occupation immediately in the presence of the water from which a small population drew its daily supply is beyond comprehension.

Stripping the matter of all verbiage, it appears that 100 cases of typhoid fever with 19 deaths were traced to the contamination of this Caterham water by the accidental discharge of a portion of the dejecta from a mild case of typhoid fever.

Plymouth, Pa.—The town of Plymouth, Pa., in the spring of 1885 was visited by a severe epidemic of typhoid fever which had its origin in the pollution of the public water supply by the dejections of a single isolated patient.

The water of the town is impounded in a reservoir at an elevation sufficient to maintain a supply by gravity; and upon the drainage ground of this reservoir, at the time of and before the epidemic, lived a family a member of which was temporarily located in Philadelphia. This member came home ill with typhoid fever during the winter of 1884–1885; and to avoid infection of the family vault, his dejections were thrown upon the snow or ice-covered ground some distance from the residence, where they remained for a number of days. When the warm rains of the late winter set in, the snow and ice about the premises melted and ran into the reservoir. Within two or three weeks an epidemic of typhoid fever occurred in Plymouth; and out of a population of about 8,000 over 1,100 were stricken with the disease, of which 114 were fatal cases.

In 1891, Mr. Hiram F. Mills, a member of the Board of Health of Massachusetts, prepared for that board a report on "Typhoid Fever in Its Relation to Water Supplies." He found that in Massachusetts

the highest typhoid death rates were not in the cities but in the towns supplied with well water. The introduction of purer water supplies had in all cases been followed by a decrease in the typhoid mortality, but in two cities, Lowell and Lawrence, with a population of 123,000, there had been during the previous twelve months about one-third more deaths than in the city of Boston with four times the population. The cause of this excessive prevalence of typhoid fever was investigated, and it was found that prior to the outbreaks, the Lowell water supply had been contaminated by the feces of typhoid patients discharged into Stony Brook, only three miles above the intake of the waterworks. This pollution was followed in about three weeks by a very rapid increase in the number of deaths from typhoid fever in Lowell, and about six weeks later by an alarming increase in the number of deaths in Lawrence, whose water supply is drawn from the Merrimac River, nine miles from where the Lowell sewage enters the river. An examination of the water from the service pipes of the city of Lawrence led to the discovery of the typhoid bacillus therein. These two cities are the only cities in the State which draw their water for drinking from a river into which, within twenty miles above, sewage is publicly discharged. "The amount of sewage that has directly entered the river (Merrimac) and its branches during the chemical examinations of the past three years is estimated to be about 1 gallon in 600 gallons of the river water passing Lawrence, and there has been no more impurity in the water that could be detected by chemical analysis, than in about one-half of the drinking water supplies of the State obtained from ponds and streams; but the facts which have been presented, showing that these two cities have so much higher death rate from typhoid fever than any other cities of the State, together with what is known of the relation of typhoid fever to sewage-polluted drinking water, are the strongest grounds for concluding that, even with the small amount of organic impurity in the water, as shown by chemical analysis, the germs of this disease are able to pass and do pass from one city to the other in the water of this river." Experiments were made to ascertain whether the typhoid bacillus could withstand a temperature only a little above freezing-point long enough to pass from the Lowell sewers to the water mains of Lawrence. It was calculated that the Lowell sewage would reach the intake of the Lawrence waterworks in eight hours, and would pass through the reservoirs into the mains within ten days. Typhoid germs kept in ice-cold water were found to be killed somewhat rapidly, but it was not until the twenty-fifth day that all the bacilli had perished. Evidently, therefore, the typhoid fever germs from the Lowell sewers may live in winter to enter the Lawrence mains in great numbers. The fact that more cases of fever occurred near the reservoirs than in the districts towards the ends of the mains is explained by the bacteriological examination of the water, which proved that the number of bacteria in the water gradually diminishes with the distance from the reservoirs. The Merrimac is a large, swift river, and Dr. Edwards denied that the ejecta of a few persons could possibly contain a sufficient number of germs to lay low some hundreds of people in Lowell. He elaborately computed the dilution which the ejecta had undergone, and came to the conclusion that the water theory involved a physical impossibility, and consequent *reductio ab absurdum*. A somewhat similar conclusion was arrived at by the Metropolitan Water Supply Commission after considering the evidence adduced for and against the theory of the Tees River water being the cause of the typhoid epidemic in the towns in that river valley. As we know nothing of the number of bacilli which a typhoid patient may discharge, nor of the number which are necessary to produce an attack of the disease, arguments and speculations of this character can have but little weight.

A further and conclusive demonstration of the absurdity of Dr. Edward's mathematical deductions are the effects of the filtration of the water upon the health of the people of Lawrence. The deaths from typhoid fever per 10,000 of the population were: —

1887	1888	1889	1890	1891	1892
11.75	12	13.75	13.33	12.20	11.11

1893	1894	1895	1896	1897
.....	5	3.07	1.86	1.62

During 1893 the filter was built, and hence during a portion of the year filtered water was being used. In 1894, however, filtered water was in use during the entire year.

That is to say, the average death rate for the six years previous to the construction of the filter was 12.36 per 10,000, while during the three years and ten months following its construction, it has been 2.95 per 10,000 of population, a reduction of 76 per cent. It can be said also, that a number of the deaths reported each year are of operatives in the large mills, who, in spite of the warning notices, drink the unfiltered and polluted canal water which is piped into these mills. In fact, it can be said that Lawrence now has one of the lowest death rates from typhoid fever of any city in the State, and has its greatest number of cases during August, September and October, similar to other cities, and at a period when the filter is doing its best and most satisfactory work in removing bacteria, and giving an effluent beyond suspicion. The cases occurring in these months cannot in any way be connected with the filtered water supply.

Besides giving a water free from disease germs, the filter is also giving a cleaner water, one more at-

tractive and palatable, and containing but 50 per cent. of the organic matter of the river water.

In conclusion, it can be said that the filter has been eminently successful in doing all that it was promised to do.

It is interesting to note that in 1892–3 another outbreak of typhoid fever occurred in the Merrimac valley, involving Lowell, Lawrence and Newburyport. Dr. Sedgwick, who again conducted the investigation, found that in December, 1892, there was a marked increase in the number of cases of typhoid fever in Lowell. It was predicted that Lawrence would soon suffer, and before long fever began to increase there; and at the same time a very unusual, and at first apparently unaccountable outbreak, occurred at Newburyport, lying below these cities at the mouth of the Merrimac. Contrary to the advice of the State Board of Health, it was discovered that, owing to a scarcity of water, the company at Newburyport had for some time been drawing water from the river. "The occurrence of this epidemic in Newburyport," says Dr. Sedgwick, "and its apparent connection with the outbreaks in Lowell and Lawrence, must be accounted one of the most interesting phenomena in our whole series of investigations, and may serve to confirm the truth of the saying that 'no river is long enough to purify itself.'"

The recent epidemic of cholera at Hamburg (1892) is interesting in many respects. Just prior to the outbreak a large number of destitute Russian Jews from cholera-stricken districts in Russia had been encamped for a time in wooden huts on the quays of the Elbe, the sewage from which passed into the dock and would be carried up the Elbe by the rise of the tide, above the intake of the water. In eighty-five days over 18,000 persons were attacked with cholera in the city, and over 8000 cases terminated fatally. Professor R. Koch investigated this outbreak, and in a paper on Water Filtration and Cholera, he gives the reasons which led him to conclude that the epidemic was chiefly due to the use of imperfectly-filtered polluted water. "The cholera epidemic in the three towns of Hamburg, Altona and Wandsbeck," he says, "has been in this respect instructive in the highest degree. These three towns, which are contiguous to each other, and really form a single community, do not differ, except in so far as each has a separate and a different kind of water supply. Wandsbeck obtains filtered water from a lake which is hardly at all exposed to contamination with fecal matter; Hamburg obtains its water in an unfiltered condition from the Elbe above the town, and Altona obtains filtered water from the Elbe below the town. Whereas Hamburg was notoriously badly visited by cholera, Wandsbeck and Altona, if one excepts the cases brought thither from Hamburg, were almost quite free from the disease. Most surprising were the conditions of the cholera epidemic along the boundary between Hamburg and Altona. On both sides of the boundary the conditions of soil, cultivation, sewerage, population—all things, in short, of importance in this respect—were the same, and yet the cholera in Hamburg went right up to the boundary of Altona and there stopped. In one street, which for a long way forms the boundary, there was cholera on the Hamburg side, whereas the Altona side was free from it. Indeed, in the case of a group of houses on the so-called Hamburger Platz the cholera marked out the boundary better than any one having the map of the frontier between Hamburg and Altona before him could have done. The cholera not only marked the political boundary, but even the boundary of the water distribution between the two towns. The group of houses referred to, which is thickly populated by families of the working class, belongs to Hamburg, but is supplied with water from Altona, and remained completely free from cholera; whereas all around on the Hamburg territory there was numerous cases of disease and death. Here we have to do with a kind of experiment, which was performed on a population of over 100,000, but which, in spite of its immense proportions, complied with all the conditions which one requires from an exact and perfect experiment in a laboratory. In two great populations nearly all the factors are the same; one only is different, and that the water supply. The population supplied with unfiltered water from the Elbe is seriously visited by cholera; the population supplied with filtered water is only visited by the disease to a very small extent. This difference is all the more important, as the water of Hamburg is taken from a place where the Elbe is relatively but little contaminated; but Altona resorts to the water of the Elbe after it has received all the liquid and fecal refuse of over 800,000 people. Under these conditions there is no other explanation for the scientific thinker than that the difference in the incidence of the cholera on these two populations was governed by the differences in the water supply, and that Altona was protected against the cholera by the filtration of the water of the Elbe."

It has been held, and it is my opinion, that the best test of the quality of a city water supply is the typhoid fever rates of that city. Thus a city with water of high quality should show low typhoid rates, and a city with water of known sewage pollution should show high typhoid rates. The final test of all public water supplies is the influence of these on the health of the consumers.

Below will be found statistics of four cities of the old world which filter their water supplies, and of four American cities which use unfiltered water, with the comparison of the typhoid fever death rate.

When we consider that the death rate from typhoid

fever has been as low as three persons per 100,000 of population in Munich (1892), while it has been as high as 154 persons per 100,000 of population in Chicago (1891), the most obtuse must admit that there is something wrong in our sanitary works or regulations which will permit of a death rate from typhoid fever in any city of this country *fifty* times as great as that of a certain city in Europe. While the Munich rate is very low, still it is not exceptional, as is shown by the following rates for that city, Berlin, Vienna and Rotterdam:

DEATHS PER 100,000 OF POPULATION FROM TYPHOID FEVER.

Year....	1890	1891	1892	1893	1894	1895	1896
Rotterdam..	6	4	6	5	5	2	12
Munich....	8	7	3	15	2-3	3	3
Berlin.... ..	9	10	8	9	4	5	5
Vienna.....	9	6	8	7	5	6	5

Now compare these rates for the same years with those of four cities of the United States:

DEATHS PER 100,000 OF POPULATION FROM TYPHOID FEVER.

Year...	1890	1891	1892	1893	1894	1895	1896	1897	1898
Chicago....	92	154	106	45	31	32	46	?	39
Pittsburg...	..	100	100	111	56	77	61		
Louisville..	88	81	72	84	72	77	45		
St. Louis...	34	30	37	103	31	19	19	19	13 (10 mos.)

Rotterdam draws its water supply from the River Maas, one of the mouths of the Rhine, and passes it through sand filters before it is delivered to the consumers. Vienna and Munich depend upon water from large springs at high elevation in the Alps; the former in the Schneeberg, 65 miles southwest of the capital, and the latter in the Mangfall Valley, 37 miles from the city. Berlin draws its water from two sources—the Stralau Works from Lake Tegel, an expansion of the River Havel, and the Frederickshagen Works from Lake Müggel, an arm of the River Spree. At both stations the water is subjected to sand filtration before it is pumped to the distributing reservoirs or mains.

The city of Lawrence, Mass., with a population (1896) of 55,000, draws its water supply from the Merrimac River, after it has received the sewage from Lowell, nine miles above. The city of Lowell, with a population (1896) of 85,700, draws its water supply partly from the Merrimac River and partly from a system of driven wells. Lawrence, however has filtered its water since September of 1893, while Lowell uses such water as is drawn from the river in its natural state. The typhoid fever death rates per 100,000 of population living, for these two cities since 1890, are shown in the following table:

Year..	1890	1891	1892	1893	1894	1895	1896
Lowell ...	158	98	90	61	55	39	42
Lawrence.	123	115	102	93	48	31	15

The average death rates for the years 1890 to 1892 inclusive, before filtered water was used in Lawrence, were for Lowell 115, and for Lawrence 113, or quite the same; while for the three years, 1894 to 1896 inclusive, during which time filtered water was used in Lawrence, the average rates were for Lowell 45 and for Lawrence 31. The percentage of reduction in the rates for Lowell was 40 and for Lawrence over 72, leaving a net reduction of 32 per cent. to be credited to the filtered water of the latter city.

This is not all that the filtered water is entitled to, according to reports from Lawrence, which show that many of the mill operatives continue to use canal water, which is unfiltered Merrimac water, in defiance of the notices posted conspicuously in the mills that canal water is dangerons to health and should not be drunk; and a fairer comparison will be of the years 1890 to 1892 inclusive, before the filtered water was introduced, with 1896, when the use of filtered water was doubtless more general than for 1893, 1894 and 1895. Upon this comparison, Lowell shows a reduction of 63.5 per cent. on the former rates, while Lawrence shows a reduction of nearly 87 per cent. on the former rates, or a net reduction in favor of the filtered water of Lawrence of over 23 per cent.

In regard to the assertion that, "although for a number of years Chicago sewage has been pumped into the Illinois river, no epidemic of typhoid fever has occurred in St. Louis as a consequence of it," will require but a brief discussion. A number of observers have shown that the typhoid bacillus cannot survive more than a few days in waters highly charged with putrefying sewage.

Now, the Chicago river is practically saturated with putrefying sewage, and inasmuch as I find no evidence in the literature of experiments showing to the contrary, I am led to believe that the typhoid bacilli do not survive any great length of time in it. But even if they found it a congenial medium in which to live, the currents created in the river by the Bridgeport pumps are so very slow that it would be many days before bacilli, emptied into the stream from the sewers, would ever reach the pumps. Let it be granted that some of the bacilli might reach the Illinois river alive. The slow current in that long and tortuous stream would afford them ample time to have perished long before reaching the Mississippi. Arguments based upon such supports are fallacious and must fall to the ground.

To therefore make predictions from the present conditions, to what will obtain in the future when the canal is opened, is the height of absurdity, and not for a moment to be countenanced.

Typhoid fever is not, as a rule, prevalent in the spring and summer, but rather a disease of the fall and winter months. It is not the intention in this argument to claim that typhoid bacilli discharged into swift-moving waters of the drainage canal, after it is opened, will meet with no obstacle, but be conveyed to St. Louis because the conditions are highly favorable to it. On the contrary, in summer the temperature of river water is exactly suited for the rapid

growth and multiplication of water bacteria, so that oxidation and nitrification will go on rapidly; these bacteria will increase in enormous numbers, making the conditions for the survival of the pathogenic bacteria highly unfavorable. But there are other factors to be taken into consideration. First, the water in the stream will be greatly diminished; and secondly, during the long summer day the river is constantly exposed to the direct rays of the sun, which, in this river water, probably do not penetrate, to the detriment of bacteria, deeper than twelve inches, but is nevertheless unfavorable to the survival of pathogenic germs exposed to it. In the fall and winter months, however, these conditions are changed. The temperature is unsuitable for the growth and propagation of the water bacteria. Organic matters are not reduced to any great extent by oxidation and nitrification, and the sunshine is not so direct or prolonged, especially when the river is covered with ice, and moreover, there is a greater depth of water in the stream. If the river is covered with ice it becomes practically a large sewer pipe, through which the sewage, with its associated bacteria, is hurried along. Dilution and sedimentation may somewhat remove the traces of sewage, but inasmuch as such pathogenic bacteria as the typhoid bacillus can survive for days and weeks in cold water or frozen in ice, and this at the very time when typhoid fever is most prevalent, the conditions for its survival and conveyance by a running stream are greatest. That under such conditions typhoid bacilli carried into the Illinois river in the large volume of swiftly-moving water of the drainage canal, when open, will reach St. Louis' water supply, is not beyond a possibility. To my mind it is highly probable.

From the mass of overwhelming testimony at our command we can draw no other conclusion than that whenever Chicago is permitted to empty all of her sewage into the Illinois river, by way of the drainage channel, it will be a serious menace to the health of this community through the water supply. Or to recapitulate, we have conclusive evidence (*a*) that the bacillus of typhoid fever is the specific cause of typhoid fever; (*b*) that it is discharged from patients sick with the disease in the feces and urine; (*c*) that although it is a bacillus which does not form spores, it is nevertheless a hardy micro-organism; (*d*) that it can live not only in water, but frozen in ice for a number of days; (*e*) there is no substantial evidence to contradict the assertion of substantial authorities that typhoid bacilli, under favorable circumstances, can live and propagate in a running stream, and we have abundant and convincing evidence that sewage-polluted water produces typhoid fever in persons drinking it; (*f*) that a sewage-polluted water may have all the appearance of purity, so much so as to defy the most exquisite tests of the chemist or the exhaustive examinations of a biologist to detect evidence of sewage in it, and still produce typhoid fever in those who drink it; (*g*) we have the statistical evidence of a number of municipal governments in both this and foreign countries showing the great improvement in the typhoid fever death rate, following either the substitution of a pure for a sewage-polluted water or the cleansing of a polluted water by filtration through sand, etc.; (*h*) we have the laws enacted by foreign governments in regard to the prevention of the pollutions of streams by sewage; and (*i*) the expressed statement in this and foreign countries of authoritative investigating committees that sewage, no matter how greatly diluted, is not fit for human consumption; and (*j*) that no river is long enough to purify itself of sewage, even if put into it at its source.

We have on the one hand the advocates of the canal basing their calculations of the harmless character of this stupendous attempt at river water pollution on antiquated and long-overthrown theories; while on the other hand modern science has reached a stage where the dangers of pollution of water supplies by the dumping of sewage into rivers is acknowledged to such an extent as to lead to legislation forbidding it altogether. I point to the Public Health Act of 1875, the River Pollution Act of 1876, the Local Government Act of 1888, and various local acts all adopted in Great Britain, and all of which render illegal and punishable the discharge of solid or liquid sewage into streams used for water supplies directly or indirectly. In France several ordinances forbid the pollution of streams under similar circumstances. In Belgium local laws attempt the same reform. The German Government Act of 1894 prohibits the discharge of (*a*) substances of such a nature that their introduction may give rise to an infectious disease, (*b*) or in such quantities as may involve an injurious pollution of the water, or of the air, or prove to be a distinct annoyance to the public. A special officer watches over the careful observance of this law. Although some States in our country have adopted modified laws against the discharge of carcasses and filthy substances into streams, it is to be regretted that we have no national legislation, as yet, sufficiently protecting the public health from such pollution of our water supplies by sewage, and we therefore are deprived of any safeguard whatever against dangers arising from the injection of such tremendous quantities of fecal matter into the canal every day, as Chicago contemplates.

I do not assert positively that this danger is a certainty; but I do consider it my solemn duty, as Health Commissioner of St. Louis, to point to the flimsy and unstable scientific foundation upon which the canal authorities are proceeding; and since in my opinion, which is based upon such scientific authorities

as quoted above, we have no guarantee that the danger of a serious pollution of our water supply is out of question, I must again call upon our representatives in Congress to leave no stone unturned for a speedy passage of the Bartholdt bill. Not until the commission, to be created by this law, has thoroughly investigated the whole question and presented its report, by which we could abide, should this huge sewage canal be allowed to be opened. This is the least we can demand of Congress and the canal authorities. In the meantime the filtration of our own water supply, which I have advocated ever since I became Health Commissioner, should not be delayed any longer, and proper measures adopted at once to that effect. I quote here from an article on filtration of water in my annual report of 1896:

"I am fully aware that a systematic and thorough chemical and biological study of the Mississippi River water has never been made, and that the difficulties surrounding the filtration of a muddy water are manifold; still, the problem is not beyond solution by highly-trained experts, chemists, biologists and engineers, and such a commission should be created and immediately put to work upon the question. With all the convincing evidence before us of the efficiency of filtration as a barrier to the dissemination of disease-producing germs, I earnestly recommend that every effort be made to bring about, as speedily as possible, the purification of our water supply by submitting it to careful filtration."

All of the above arguments which go to show the danger of the sewage of Chicago to the inhabitants of this city apply with equal force to every other city that discharges sewage into the Mississippi River and its tributaries above us. We therefore know that the Mississippi River water at this point is sewer-polluted. It is a common sense fact, and does not need demonstration by skilled chemists and biologists, although the evidence from that source is overwhelmingly conclusive.

The evidence at hand is so strong and convincing that we cannot doubt for a moment that our water supply is the cause of disease among us, and may at any moment precipitate upon us an epidemic of disease having all the magnitude and fatal severity of the Hamburg cholera epidemic.

Notes and Items

A FEW weeks ago we referred in these pages to the value of Wielander's pillow-slip mercurial treatment. The theory of Wielander is that the absorption of mercury is almost wholly by way of the lungs, even when it is applied to the skin. That such is the fact, is proven by a case recently reported from one of the Vienna hospitals, in which a patient was salivated by being placed in a ward in which a number of patients were being treated by the pillow-slip method.

IT has been recently charged that canaries frequently convey tuberculosis. This is denied by Mr. Jacob Mackley, who is the head of a large firm for breeding canaries, which has its headquarters at Norwich, England. The birds are bred by workmen who have them in their rooms, the rooms being lined with cages. It is stated that nearly three-fourths of all the canaries raised in this section are bred in sleeping rooms. Mr. Mackley states that, if it is true that canaries are active disseminators of terbucolosis, Norwich would have long since achieved a notoriety as a center for consumption.

LA PRESSE MEDICALE states that the sanitary regulations against tuberculosis in Naples, in 1792, were as severe as could be desired by the strictest modern sanitary officer. The law passed in that year required that every medical man should report each case of ulceration of the lungs that came under his observation. The penalty of failure to do so was a fine of 300 ducats, and a repetition of the offence, banishment for ten years. The treatment of these patients in hospitals was made obligatory; their clothing and effects were separated, and, after death, a portion were disinfected, and others burned. Severe punishment was meted out to those who sold or purchased their effects. The apartments which they had occupied were disinfected, the flooring renewed, the doors and windows burned, and the dwelling was to remain vacant for a year.

AT THE last meeting of the American Medical Association the American Proctological Society was formed. Joseph M. Mathews was made president, and in his opening remarks said: "It is a notorious fact that there is more quackery practiced in the disease of the rectum than in any other department of medical practice. This state of things is to be deplored. After an experience of twenty years in this work, I wish to say that these important and most serious affections should be entitled to a separate and special consideration, and who shall dare to say that those who practice them are not entitled to the privilege of forming themselves into a society."

We would answer the question of Dr. Mathews with a most vociferous affirmative. We have long felt the need of a society of proctologists that would once for all settle the question of the best operation for hemorrhoids, and which will suppress the quack specialists, "orificialists" and such ilk.

La Presse Medicale, in a recent issue, refers to the organization of the new society, gives the titles and names of those who read papers, and comments adversely upon the necessity of such an organization, stating that there is no necessity for rectal specialists in France, and practically none are found there.

MEDICAL REVIEW

A WEEKLY JOURNAL OF MEDICINE AND SURGERY

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THE ORIGIN OF CANCER.

The Italian school which has been earnestly studying cancer for so many years is quite convinced that the blastomycetes play an important rôle in the production of malignant growths. Sanarelli is perhaps the leading Italian observer who believes in this theory. Some leading pathologists, notably Hektoen, believe the appearances which these observers have found and which they attribute to the blastomycetes are in reality due to cellular inclusions. Recently, Curtis, of Lille (*La Presse Medical*, No. 20, 1899), reports negative results in searching for a parasite for cancer. He believes that too much attention has been paid to epithelial growths upon the surface and which are apt to be contaminated with extraneous micro-organisms. His work has been largely done upon cancers of the internal organs, those of the breast and testicle, in eighteen of which the most careful study failed to reveal germs, and none were obtained by cultivation.

CLASSIFICATION OF MENTAL DISEASES.

The *Medical Age* (July 10, 1899) refers to a recent classification proposed by Dr. Andrizen. The decisions are based upon the fundamental facts of evolution. There are five groups: (1) Aphrenia, arrests of cerebral development, with absence or deficiency of evolution in personality; (2) oligophrenia, enfeeblement of cerebral development, with a parallel enfeeblement in the evolution of personality; (3) paraphrenia, anomalies and perversions of cerebral development with corresponding evolution of personality; (4) phrenopathia, morbid conditions or derangements occurring in brains of nearly full development with previous apparent health, with corresponding morbid alterations of the personality; and (5) lipophrenia, terminal conditions of mental dissolution secondary to previous insanities.

We see very little in Dr. Andrizen's classification that is new, excepting the use of the terms, which unfortunately have in some cases been applied to other conditions than those mentioned in his classification. It is this absence of an accepted standard that has imported such tremendous confusion into the nomenclature of nervous diseases. Almost every student of psychiatry has felt it incumbent upon himself to devise a new classification. If they had discreetly kept these locked in their own breasts it would have been infinitely better for the science.

There is no criticism to be passed upon Dr. Andrizen's classification more than it is not needed, and the large Greek words which he has used to designate the different primary forms of mental disease might prove a burden to the memory. Division IV, the phrenopathia, includes those forms of mental disease which are termed mania, melancholia, paretic dementia, etc. It is in this sub-group that the chief difficulties of classifying mental diseases are found, no satisfactory system having yet been devised.

DISSEMINATION OF TYPHOID BACILLI IN URINE.

More than a dozen years have passed since Bouchard called attention to the elimination of typhoid bacilli by the urine. He claimed that in 50 per cent. of the cases, at one time or another, the bacillus typhosus was eliminated by the urine. Public health officers have been urging the disinfection of the feces of typhoid patients; but practically nothing has been said of the urine. It has been definitely determined that typhoid bacilli may go on multiplying in the bladder for years, sometimes without causing a marked cystitis. In one of the estimates of the number of bacilli in an infected bladder it was thought that 1,000 c.c. of the urine diffused in 10 cubic meters of water would give 50,000 bacilli to each c.c. Such enormous numbers as these will convey some idea of what a magazine of infection such an infected bladder may become.

As to the frequency with which the bacilli are eliminated by the urine, authors vary. Bouchard's figure of 50 per cent. is not accepted; but from 20 to 30 per cent. has been shown by some recent studies. The examinations have not been sufficient to establish an accurate figure. The second or third week of the disease is the time when they appear in the urine. They may continue indefinitely, as the urine is an excellent culture medium; the bladder once infected harbors the parasite long after it has ceased to be eliminated by the urine.

While the feces always contain the bacillus, it is probable that they are less numerous than the urine. There is nothing like the same danger of infection, as feces by their color and odor at once betray their presence. This is not the case with urine, which may easily soil linen and clothing, in this way depositing thousands of the organisms. The spot once dried presents but a faint mark, which is easily overlooked.

Unfortunately the bacilli can only be detected in urine by laboratory methods. In a small proportion of cases the urine is rendered turbid by them. If a typhoid case suddenly develops a turbid urine, it may reasonably be inferred that the infection is from the typhoid bacillus. It may be associated with other micro-organisms, especially the pus producers.

The infection is easily eradicated. If marked cystitis is present, it may be necessary to wash out the bladder. Commonly all that is necessary is to administer twice daily urotropin in seven-grain doses. This will destroy the bacilli in a few days and sterilize the whole urinary tract.

SCIENTIFIC AND MEDICAL TOPICS IN THE LAY PRESS.

The daily newspapers, in their search after the sensational, are invading the medical field. Their efforts to instruct the public in scientific matters is generally marked by a general mis-statement of facts and display of gross ignorance that beggars description. If scientific or medical articles are to appear in the lay press, it is the duty of these journals to have them prepared by someone who has some knowledge of the subjects which are to be published.

This does not apply to the various "inspired" articles which appear from time to time in the public press and which are largely for the purpose of exploiting some individual or his work. Indeed, the bulk of these communications are covert advertising, published for the purpose of directing the footsteps of the unwary to the consultation rooms of those who have some wonderful discovery for the cure of human ailments.

In the July 16th issue of the *Chicago Tribune* is an article by a Dr. Thomas J. Biggs, who cures leprosy by the administration of cobra venom. The article in question is in quotation marks and is evidently contributed by Dr. Biggs himself. It is illustrated by two cuts; one is a picture of Dr. Biggs, which shows him to be a man apparently between thirty and forty years of age, rather fat, quite bald, with a remarkably high forehead. The second picture shows what is presumed to be Dr. Biggs grasping an exceedingly obese cobra by the nape of the neck in the act of extracting its venom. We are informed that the doctor has fitted up a place to accommodate about 125 patients. These are to be confined to the worst cases, and while up to the present he has not had any leprous subjects to operate upon, he has a pleasing collection of cobras.

According to Dr. Biggs, "It was Dr. Bardoni, of Turin, who first discovered the bacillus of leprosy—a pencil-shaped microbe resembling that of tuberculosis, but having one end thicker than the other and enclosed in a sheath or cell. This sheath may account for its amazing longevity, for not even the bacillus of tetanus has a greater power of surviving under all conditions. Dr. Bardoni and others attempted to cure leprosy by inoculation, but after some years of experiment the idea was given up, the results not justifying the effort. Where the soil is adapted to the culture, leprosy will flourish amazingly, but in blood that is strongly proof against the leprous bacillus inoculation is useless."

He states that the discovery of the antagonism of the cobra venom was made in Northern India, where, it is claimed, that when a leper is discovered, he is immediately given the choice of being bitten by a cobra, or being buried alive. Of course, both have their inconveniences, but the unfortunate generally chooses the cobra bite as a somewhat less certain application of the death penalty. According to Dr. Biggs (he does not say that he has been there, or that he has ever seen this), a young and vigorous cobra is secured, starved and teased until his natural pacific tendencies are entirely lost, and to the accompaniment of weird ceremonies the individual infected with leprosy thrusts his arm toward the cobra, which strikes, depositing the contents of his poison sac in the arm of the victim. According to Dr. Biggs, this was originally intended for the purpose of eliminating lepers from the community, but they learned that many of those who were bitten by the cobra recovered from the disease. In this way they have established that cobra venom cures leprosy. An essential feature of the treatment is that as soon as the patient has been bitten by the cobra he immediately proceeds to fill himself with as much whiskey as he can conveniently hold. The cobra venom antidotes the leprosy and the alcohol antidotes the cobra venom. The nearest explanation vouchsafed by Dr. Biggs is the following: "The cobra venom is a subtle fluid to which all animal life succumbs. It immediately destroys every vital function, and so indestructible is it that it may be boiled, frozen and mixed with corrosives, diluted, or taken from the hundredth inoculation, yet it survives all. It is like curing like, carried to the superlative. Thus the bacillus of deadly leprosy succumbs to the deadlier venom of the serpent and that in turn yields to the large doses of alcohol."

What a splendid argument for the temperance people! Cobra venom can cure the deadly poison of leprosy because of its still more destructive action, and alcohol, most deadly of all, can overcome the dreaded cobra venom. The argument reminds us of a dear friend who was sadly addicted to the use of intoxicants; in fact, he abhorred water. On one occasion, when arguing regarding the value of some of his favorite beverages, he stated that if a bright-polished metal-like steel be placed in water, in a few days it would be covered with rust. He said "if water would attack and destroy a piece of iron or steel, what could it not do for the delicate coats of the stomach?"

We have quoted the above quite freely to show how wide a lay journal may be from the facts, even when the article is in quotation marks.

Current Medical Literature

DERMATOLOGY AND GENITO-URINARY DISEASES.

A Unique Case of Pityriasis Versicolor.—W. S. Gottheil* reports a case of this affection occurring on the palm of the hand and present for fifteen years; the centre of the left palm was occupied by the efflorescence, which extended well on to the inner border of the hand; the fingers, wrists and dorsum were free, and no trace of the eruption upon any other part of the body; the color was unusually dark. Examination of the scales under the microscope showed numerous mycelia and spores, presenting the characteristic appearance of the microsporon furfur. The disease is extremely rare upon the neck and face, probably because these parts are most frequently and thoroughly cleansed of the superficial epidermis in which the parasite proliferates; it has never heretofore been observed on the palms or soles.

Subcutaneous Use of Iodipin in Tertiary Syphilis.—V. Klingmueller† reports the result of using subcutaneous injections of iodipin in Neisser's clinic in Breslau. Iodipin is an organic combination of iodine with sesame oil, discovered by N. Winternitz. The especial advantages of iodipin are as follows: 1. By even very large doses of iodipin subcutaneously no toxic effects were observed. 2. All the iodoform introduced into the body is used up and made effective. 3. Subcutaneous injection is painless, comfortable and cheap. 4. Iodipin exercises the specific effect of iodine by subcutaneus administration in the same way that other iodine preparations given by the mouth. 5. Iodism follows the subcutaneous injection of iodipin. In eight cases of tertiary syphilis treated in this way good results were obtained. Dose was daily 20 cc.

Anastomosis of Bladder to Rectum —J. Frank‡ presented a preliminary report of experimental research on this operation. The operation consists of anastomising the bladder to the rectum with his decalcified bone coupler, described in the *Journal* of June 19, 1897, etc., and now carried out on fifteen dogs; ten recovered and fifteen died; post-mortem showed no septic conditions of ureters or kidneys. The dogs pass three or four watery stools a day through the rectum, and the male dogs hoist their legs in the act of micturition, but without accomplishing it through the penis; the animals are playful and lively after recovery, and give no evidence of an operation having been performed. A complete paper will be published containing detailed account of the experimental work, etc.

*N. Y. Med. Rec., July 1, 1899.
†Berl. klin. Woch., June 19, 1899.
‡Jour. Am. M. A., July 15, 1899.

Hereditary Syphilis Following a Distant Period of Infection.—P. de Molenes* describes a very interesting case of hereditary syphilis that would tend to show that the laws relating to the inheriting of syphilis are by no means rigid. Fournier has promulgated the following three laws in regard to hereditary syphilis: (1) The influence of hereditary syphilis is exercised very unequally according to the time the disease has existed in the parents. The minimum corresponds to the first three years of the infection. (2) The maximum is found in the first year of the infection. (3) After the first three years the hereditary influence continues to decrease, and its effect is much less marked. There are cases, however, where the influence has been shown as long as eighteen and twenty years after the infection. This is called "hérédité syphilitique à long terme." The case is that of a woman of 44 years. One healthy child was born, who showed no signs of syphilis. Following him came seven children, all born at full term, and showing at the time of birth no traces of syphilis. All of these children died at the ages of 15 to 20 months from what was then diagnosticated as meningitis. She herself has been affected for a long time with a syphilitic palmar psoriasis, which improved under antisyphilitic treatment. The father of these seven children died some seven years ago of a tumor of the tongue, which was probably a leucoplasia in an old syphilitic. The patient married a second time, in 1896, and gave birth to a presumably healthy child, who died, just as the others had done, at the age of 18 months. The author considers this an effect of the original syphilis, received twenty-one years before, and although from a healthy father the child was infected still from the mother.

INTERNAL MEDICINE.

Urid Acid Theories.— A. C. Croftan† reviews some of the theories advanced heretofore regarding uric acid, and gives the results of some original investigations made to corroborate the theoretic views advanced by himself. The series of investigations already published on the chemical relationship between uric acid and nuclein, seems to prove that nuclein on oxidation gives uric acid; if oxidation is deficient or no oxygen is present, the alloxuric bases are formed instead; these are basic substances, soluble in water, represented by xanthin, hypoxanthin, adenin, etc. The function that is perverted is the nuclein metabolism; if oxygenation is sufficient we have the formation of uric acid, which is the normal process; its perversion may be two-fold; nuclein metabolism may be excessive or oxygenation may grow deficient; in either case, we will have a

*Nouvelle Iconographie de la Salpêtrière, May and June, 1899.
†Jour. Am. Med. Assn., July 8, 1899.

decrease in the formation of uric acid and a corresponding increase in the formation of the alloxuric bases; this perversion is made responsible for so-called uric acid lesions. Uric acid is a non-toxic substance, almost insoluble in the tissue juices; its salts are essentially insoluble. The alloxuric bases, however, are readily soluble and possess highly toxic properties. Uric acid was found in the blood of twelve normal subjects, the analysis of large volumes of blood having been made. A number of quantitative determinations of the alloxuric bases have been made in the urine of subjects suffering from gout and other manifestations of uratic diathesis, and in every instance an increase of these bodies over the normal was found. With an increase of leucocytes, an increase in the uric acid and alloxuric bases was found chemically, which was to be expected, since the leucocytes furnish the bulk of the nuclein. Normally all the nuclein is converted into uric acid, an innocuous, non-toxic substance; a perversion of the normal function leads to the formation of alloxuric bases, which have toxic properties. The two indications to be met in treatment are a reduction in nuclein-katabolism and a raising of the processes of oxygenation. To attain the first object, everything should be avoided that will produce a leucocytosis, viz., certain drugs and foods; the second object, the one which gives the better results, can be attained by treating the case as one of anemia, using iron and arsenic, and in acute cases inhalations of oxygen gas.

Apparent Idiopathic Enlargement of the Heart in Children.—Hauser* considers the question of enlargement of the heart in children, where none of the usual causes can be discovered. Before, however, such a diagnosis can justly be made the percussion outlines must be absolutely reliable. The author takes exception to the old idea that percussion in children is easier than in adults; he rather believes in the idea of Gerhart that there are more sources of error found in children than in adults. In all cases the absolute dullness should be taken as the measurement. The author describes several cases in which an apparent enlargement of the heart was found, but upon more careful examination the enlargement was found to be dependent upon various accidental factors; in one case, for example, the enlargement is explained by the lack of expansion of the lungs. In two other cases, a high position of the diaphragm caused the apparent enlarged percussion dullness.

Accidental Heart Murmurs; Their Causes and Differential Diagnosis.—G. W. Webster† reaches these conclusions, after a discussion of this subject: (1) accidental heart murmurs may occur when there is neither anemia or fever, as in certain forms of intoxication; (2) accentuation of the pulmonic second sound may occur in accidental heart murmurs; (3) an accidental murmur may be diastolic in rhythm; (4) the term should be employed to designate those cases of cardiac murmur which cannot be clearly demonstrated to belong to the organic class; (5) no single theory can be made to reasonably account for all accidental murmurs; (6) the theory of Potain in regard to cardio-pulmonary murmurs seems a reasonable explanation of some of the accidental murmurs; (7) in all cases of organic disease the vibrations originate in the fluid blood, due to the formation of "fluid veins." The theory that the accidental murmurs originate in vibrations in the walls of the vessels or of the conus, and are communicated to the moving column of fluid, and so not carried by it, does not seem quite reasonable, but might serve to explain the limited area of audibility of some of these murmurs; (8) the wide diversity of opinion in regard to rhythm, point of maximum intensity and area of audibility would seem to indicate careful, accurate observations improperly interpreted or else an attempt to explain all accidental murmurs on one theory; (9) In many cases, especially apex systolic murmurs, or in those heard over the body of the heart, a correct diagnosis cannot always be made without awaiting the results of treatment.

Cerebro-Spinal Meningitis.—G. L. Eyster* reports two cases of the epidemic form of this disease, in which there was a history of preceding coryza, the presence of muco-purulent discharges from the nose, cultures from which developed a coccus with all the characteristics of Weichselbaum's diplococcus intracellularis meningitidis; in both the disease was markedly intermittent, assuming in one the tertian type, and in the other the quotidian. Lumbar puncture was made in both cases and cultures showed the pressure of the diplococcus in each specimen. One case, a man of 46 years, resulted fatally on the eighteenth day, and autopsy revealed involvement of the membranes of the brain and cord, with several foci of softened semi-purulent tissue in the brain substance; the second patient, a girl 9 years old, eventually recovered, after a protracted convalescence, with partial deafness.

Constipation and Diarrhea.—R. Schutz† considers these two primal conditions of intestinal functions from an etiologic standpoint, and from that a rational therapy is to be devised. According to Nothnagel's theory, physiologically, the intestinal movements depend upon the stimulation of its contents upon the sensory nerves of the mucous membrane of the intestine and thus reflex action upon the

*Berl. klin. Woch., July 3, 1899.
†Jour Am. Med. Assn, July 22, 1899.

*Jour. Am. Med. Assn, July 22, 1899.
†Berl. klin. Woch., June 26 and July 10, 1899.

muscles. The pathologic characteristics depend upon the condition of the intestinal muscles in the character of the stimulation, or in obstruction to the free passage of the intestinal contents. There are many other theories advanced to explain the physiologic and pathologic conditions of the intestinal tract, which it is impossible here to consider Especial importance is given in all cases to the careful examination of the feces. The amount of mucous in the stools gives an idea as to the existence of a catarrhal condition of the mucous membrane. The question as to whether mucus in the stools always means something pathologic, is generally answered in the positive. The possible exception is that hard masses of feces may cause a hypersecretion of mucus over a certain limited portion of intestinal mucous membrane, as a kind of protection to the underlying muscle. The size, form, color, odor of the feces, are all to be considered. From a simple examination of the stool the following points can be determined: The presence of mucus in abnormal quantity is easily determined by practice. If there is a pathologic amount found, it points always to catarrh of the large intestine. Large quantities of mucus without feces point to the location of the lower part of the large intestine. Mixture of feces with mucus points to the upper part of the large intestine. Muscle remains with mucus and absence of fever point to a diseased condition of the small intestine. The examination of the stool can further be strengthened by a single microscopic examination for blood, pus, etc. In regard to the therapy of constipation, the use of purgatives is to be avoided. Diet regulation should be used only with great care, as a too-coarse diet would have the same bad effects as purgatives. The administration of oil is recommended by the author.

Treatment of Tuberculosis.—J. F. Peavy* advocates a therapeutic measure based on the physiologic consideration that oxidation is the ultimate measure of vital action, as well as the source of vital force, or resistance of the body as a whole, or of its cellular elements; oxidation and nutrition become the ultimate factors on which depend the generation of vital force. The state of the respired air affects the amount of oxygen which the blood is able to take up in the lungs; humidity and electrical tension, as well as the constitution of the air, are also factors; the tonic effect of mountain air is due to the presence of ozone, diminished humidity, diminished heat in summer and increased electric tension in the air. Somewhat similar conditions can be artificially produced by the static machine, used as an eight-plate influence machine, fitted with a Winshurst charger. The patient is placed on an insulated stool connected with the positive discharge rod; the negative terminal is formed by a spray-electrode and adjusted so that its cluster of points is two inches from the patient's nose and mouth; the patient is simply required to breathe, and we have the conditions for rapid and effective oxidation.

*Jour. Am. Med. Assn., July 8, 1899.

NERVOUS AND MENTAL DISEASES.

Akromegaly; With Report of a Case Presenting Some Unusual Features. — W. N. Lackey,* after briefly reviewing the literature bearing on this disease, reports a case occurring in a negro, 28 years old. Up to the age of 13 he was a strong, healthy boy; he then began to suffer with pains in the right hip and the extremities; he remained in bed two years owing to severe pains and during this time his hands and feet grew remarkably and his stature increased in height; the patient at present cannot walk, the pains continue; he has small appetite, but consumes large quantities of water. He has lost strength, and the weakness of the muscles of the back and extremities is especially marked. Physical examination shows remarkable measurements; hands and feet are of excessive size, patient has a reach of 8 feet 9 inches, measures 58 inches from notch to heel, and his height is 8 feet 6 inches, exceeding by two inches any height reported; weight is only 175 pounds; circumference of neck 15 inches; left lobe of thyroid is much enlarged. Mental condition is unimpaired.

On the Weight of the Heaviest Brain Yet Described.—The weight of this brain, described by G. C. van Walsem,† is 2850 grams. The heaviest brain described before this is 2400 grams, which was noted by Sims. The brain in question was that of a 21-year-old idiot, whose family history was very neurotic. Two brothers were also makrocephalics and died in early infancy. The patient suffered from ordinary epileptic attacks and was mentally deficient. There were no paralysis nor any muscular anomalies. The sensory functions were normal. The gait was spastic to a slight degree and the reflexes increased. The brain showed an increase in size in all directions. The spinal cord was somewhat enlarged. The cranial nerves were enlarged. Microscopic examination was as follows: The ganglion cells were separated widely from one another and did not show a very definite stratification. The great pyramidal cells were few in number. The fibers were everywhere clearly shown. The tangential layer showed wider meshes than normal. The blood vessels were normal in appearance. The glia cells were not increased.

The Role of Wound Infection as a Factor in the Causation of Insanity. — A. T. Hobbs‡ found 80 women, of 163 examined, who had inflammatory lesions of the pelvic organs, brought about by septic invasion

*Phila. Med. Jour., July 22, 1899.

†Neurologische Centralblatt, June 1, 1899.

‡Amer. Jour. of Obstet., July, 1899.

at the time of a puerperium; three cases were in an asylum for insane. Subsequent upon suitable surgical treatment of these 80 cases, there was return to physical health in nearly all, and 36 recovered mentally, 20 were mentally improved, while the mental condition of the others, or 30 per cent., remained stationary. This emphasizes how important a factor the micro-organism is in thus directly or indirectly being the cause of many a case of mental alienation, and teaches that too great care cannot be adopted by the accoucheur in protecting his patients from sepsis and, that the removal of inflammatory lesions of the pelvic organism, when found, is to open a possible avenue of escape from mental thraldom of many of these unfortunate exiles of humanity.

Observations on the Toe Reflex, "Phenomène des Orteils."—SCHÜLER* records some observations on Babinski reflex "phenomène des orteils." His figures are as follows: In 10% of men no reflex at all was obtainable; 8% extensive movement, especially in the great toe. In 80% a definite flexion movement was obtained; in 2% of the cases the result was too indefinite to be tabulated. In women nearly the same figures were noted. In children the result was somewhat different. No reflex in 40% of the cases; 12% showed a clear extension reflex, 30% flexion, in 18% indefinite movement. These figures very nearly coincide with those of Cohn's. In 8 cases of pyramidal disease the Babinski phenomenon was clearly present. This reflex could be obtained by a very minimal irritation. This conclusion is then reached: Inasmuch as in diseased conditions of the pyramidal tract, this reflex can be obtained by a minimal excitation, then it can be used in addition to other symptoms as an important differential diagnostic point between organic and functional diseases.

A Case of Hereditary Syphilis of the Spinal Cord, with Autopsy. — GILES DE LA TOURETTE and G. DURANTE† make a further contribution to their publication in 1896, concerning hereditary syphilis producing spinal cord lesions and affecting only the cord. The patient described in the former article under case I. died, and the microscopical examination furnishes the material for the new paper. The cord and brain were preserved in Müller's fluid and showed the following histological changes: 1. Degeneration of the crossed pyramidal tract, the whole length of the cord, but more marked on the right than on the left. The direct pyramidal tract is normal. 2. Degeneration of the direct cerebellar tract on both sides and throughout the length of the cord; this degeneration is less intense than that of the crossed pyramidal. 3. Slight degeneration of Gower's column. 4. Posterior columns normal in lumbar and dorsal regions. 5. Gray substance in the dorsal region shows a light atrophy of the anterior horn left. 6. Clark's columns have fewer cells on the left than on the right, but are normal. 7. At all levels of the cord exists a periarteritis, which finds its greatest development in the cervical region. The brain itself was perfectly normal. The pathogenesis of this condition is the following: A focus of syphilitic myelitis developed in the first few years of the individual's life. This myelitis disappeared, leaving only the slight atrophy of the left anterior horns; following this syphilitic focus, secondary degeneration of the columns in the cord took place. The endarteritis and periarteritis are not the cause of the degeneration.

*Neurologische Centralblatt, July 1, 1899.

†Nouvelle Iconographie de la Salpêtrière, May and April, 1899.

Four Observations of Tremor.—BOINET* notes four unusual cases of tremor. Case I. Following an attack of what was in all likelihood Asiatic cholera, a lieutenant in China noticed an intention tremor, a paralysis of the muscles of left arm and the left half of the face. In the absence of any symptoms which would point to hysteria, Boinet believes that these symptoms were caused by a toxic multiple sclerosis, due to the attack of cholera. Case II. A sailor, aged 32 years, presented transverse oscillations of the head which increased in frequency under any emotional excitement. This tremor increased with any voluntary movement. Gait is normal; pharyngeal reflex is absent. This is a hysterical tremor, most pronounced at the level of the head. Case III. Parkinson tremor, following an emotional disturbance, in a man who had frequent attacks of malaria. The seat of the tremor here is also the head. The oscillations are regular and horizontal, having a rapidity of ninety times a minute. In repose, the tremor stops. His gait is characterized as a sort of antepulsion. Retropulsion is also present. Hemianesthesia, lack of pharyngeal reflex, leave no doubt that the diagnosis of hysteria is justified. The Parkinson tremor and the rhythmic chorea are hysterical, the development of which the malaria has favored. Case IV. Also a hysterical tremor. Parkinson tremor limited to the right side. This appeared as a result of an emotional shock.

On the Measuring of the Toe Reflex, "Phenomène des Orteils."—COHN† considers the reflex first described by Babinski and called by him "phenomène des orteils." This reflex is a flexion of the toes in the metatarso-phalangeal joint which takes place when the toe of the foot is stimulated. In healthy individuals an extension never takes place; this is always regarded as pathologic. The extension movement has been observed in cases where the pyramidal tract has been affected. To investigate this phenomenon Cohn examined a number of normal individuals and then some affected with various organic

*Revue Neurologique, June 30, 1899.

†Neurologische Centralblatt, July 1, 1899.

lesions to see if the conclusions of Babinski were justified or not. In 60% of normal cases the author observed the reflex as described by Babinski; in 20% he found an extension; in 10% no reflex movement at all could be obtained. From these figures it is evident that the extension movement can not be regarded as always prolonged, as Babinski asserts. The following conclusion is reached by the author: "The stimulation of the toe of the foot, in the majority of people, causes a reflex motion, which is a flexion of the toes. In lesions of the pyramidal tract, whether organic or functional, an extension reflex movement of the toes is observed. In no manner is it justifiable, however, to regard this as pathognomic for the recognition of such a pathologic condition."

OBSTETRICS AND GYNECOLOGY.

Hemostasis in Intrapelvic Surgery.—A. C. Heffenger* states that absolute control of hemorrhage is the keynote to successful intrapelvic surgery, and can be obtained only by the skilful and thorough use of the means summarized as follows, viz.: Hemostatic and traction forceps or clamps, ligature, suturing, digital and sponge compression, gauze packing, hot water, hydrogen dioxid, and the actual cautery. The various kinds of forceps and ligatures with indications for the use of each are mentioned; the method of sewing the ovarian and the uterine arteries is detailed; the method to be employed in the ligation of the latter is given for hysterectomy in cases of simple uterine fibroma, cancer of the uterus, and the large myomatous uterus firmly impacted in the pelvis. The symptoms, causes and treatment of secondary hemorrhage are also given.

The Uterine Fibroid; What Shall we do with it?—D. T. Gilliam† looks upon the uterine fibroid as comparatively innocent, in so far as its life-destroying propensities are concerned; it sometimes kills, is capable of making life unbearable, but in a very small proportion of cases incipient fibroids attain to a size to give serious trouble and the growth is in a large measure self-limited. As a life-saving agency the knife must be abandoned, except in rare and carefully selected cases. Greater circumspection and more conservatism on the part of the surgeon are contended for; the smaller growths should be let alone, and in more serious cases the question of operation should be decided by the patient, after being told of all possibilities in the case.

Maternal Impressions.—H. F. Lewis,‡ after referring to the theory that maternal impressions explain the occurrence of monstrosities and anomalies, notes the fact that these occur more frequently among domestic animals, fishes, insects and in the vegetable world. In human fetuses, even at term, there are sometimes found remains of amniotic bands and adhesions, which, by interfering with development of different parts at an early period of gestation, were the causes of various malformations. All malformations and monstrosities can be explained by purely physical and mechanic causes entirely remote from psychic influence, so that there is never any reason to invoke the mysterious or supernatural to explain natural phenomena.

Appendicitis as a Cause of Inflammatory Disease of the Right Ovary and Tube.—A. J. Ochsner* reports one case in full and gives abstracts of histories of similar cases operated on in 1898; a table of appendicitis cases operated at the Augustana Hospital in 1898 is also given; from these experiences he believes that the matter of secondary infection, especially of the right ovary and tube, has been underestimated. The following conclusions seem borne out: (1) Appendicitis frequently causes inflammatory diseases of the right ovary and tube and occasionally of the left also; (2) this condition is likely to give rise to chronic invalidism, resulting from congestion and to menstruation; (3) in operating for relief of pyosalpinx the condition of the appendix should always be determined; (4) in operating for chronic or recurrent appendicitis, in patients suffering from dysmenorrhea, the right ovary and tube should be examined; (5) if pain is limited to the right side in severe dysmenorrhea, the appendix is frequently primarily involved; (6) in catarrhal appendicitis in which there is a fecal concretion in the appendix, or in appendicitis obliterans, the pain is frequently more severe during menstruation; (7) in patients who have recovered from gangrenous appendicitis there is frequently no further disturbance from the condition of the appendix except digestive disturbance due to adhesions, while the secondary disturbance in the ovary and tube may continue to be very great; (8) in young girls suffering from dysmenorrhea, the history should be followed carefully to determine the presence of a previous attack of appendicitis; (9) the fact that many of these cases are mistaken for salpingitis accounts for the theory that appendicitis is more common in men than in women.

Is a Sloughing Process at the Child's Navel Consistent with Asepsis in Childhood?—R. L. Dickinson† makes a plea for the application, in amputating the cord, of the surgical principles that govern other amputations. The following principles are opposed to the prevailing practice but would seem to bear on the matter: (1) Mass ligature should be avoided; ligatures belong on bared vessels. (2) A hernial opening should not be closed by a granulation

*N. Y. Med. Rec., July 22, 1899.
†Jour. Amer. Med. Assn., July 22, 1899.
‡Amer. Jour. of Obstet., July, 1899.

*Jour. Amer. Med. Assn, July 22, 1899.
†Amer. Jour. of Obstet., July, 1899.

scar; primary union is readily substituted. (3) If the location of the future line of demarkation is known, removal should be practiced at or beyond that point. In the case of the funis one knows where the line of separation is to be. (4) That form of operation should be chosen which will do away with sloughing or pus production. Removal alone is prevention. To frankly sever the cord at the skin margin, with ligature of the vessels or suture, one or both, brings about safe, clean, prompt healing. Even the pressure of a pad and an adhesive strap may suffice. A review of literature on the anatomy, histology, pathology and treatment of the cord follows, together with a description of the method of amputation advocated, fully illustrated.

The Uterus.—A. GOLDSPOHN* says that vagino-fixation, ventro-fixation and ventro-suspension of the uterus should be avoided in cases that retain any capacity for conception; they effect at best a substitution of one abnormal condition for another; the essential features in the technique of these operations that give them any stability in good results are antagonistic to the interests of the uterus in gestation and labor. The round ligaments are the only normal structures that keep pace with the uterus in its physiologic changes and migrations; they grow with it during gestation and participate with it in involution after parturition. The best results therefore are obtained from shortening these ligaments by way of their natural channels—the inguinal canals; the ligaments are not distorted and no sutures of any kind are needed within the peritoneal cavity, as in shortening them by any other possible route. This procedure, which resembles that of Bassini for hernia more than it does the operation introduced by Alexander, is the only operation that has been proven to stand the crucial test of pregnancy and labor.

Symptomatology and Therapy of Myoma of the Uterus.—In this very thorough and detailed article, L. LANDAU† discusses many of the important questions of myomata of the uterus. He first considers the diagnosis of myoma of the uterus and the determination of the variety of myoma, whether organoid or histoid. The size of the growth can not be determined by the severity of the symptoms. This depends much more on its situation. A small myoma, for instance, situated in the lesser abdominal cavity, by pressure on the nerves and blood vessels, may cause greater disturbance than a much larger growth situated in the greater abdominal cavity. Hemorrhage is a greater danger from myomata than is commonly supposed. In many cases of myoma there is found, post-mortem, edema, degeneration of the heart muscle, albuminuria, which are due to the hemorrhage continuous though slight at any one term. There is further an inflammatory process or a purulent condition of the adnexa found. Hydrosalpinx, cysts, and abscess formation often result from myomata. Chronic peritonitic processes have been observed, though the method of its formation is not clearly understood. A malignant degeneration of the myoma is more frequent than is supposed, and the benign nature of myomata is by no means so certain in all cases. In other cases there is an ascites which can not be explained by the assumption that there is a carcinomatous or sarcomatous metastasis. The most frequent cause which compels a patient to seek medical aid is hemorrhage. This is caused most frequently by an endometritis. Curetting is here only a palliative measure, as the cause of the endometritis is not removed. The use of steam baths is not recommended by Landau ordinarily, as he has found that dangerous results often follow. The relation between the climacteric and formation of myomata is considered, and the author does not believe that it is advisible, in a case where the presence of the growth causes uncomfortable symptoms, to wait for the climacteric for a possible shrinking of the growth and the disappearance of the symptoms, as often no such result follows. The removal of the ovaries, causing thereby an artificial climateric, has not had the brilliant success which at one time was thought possible. There remains then total extirpation of the uterus with the growth as the best method when the myoma causes sufficiently bad symptoms to affect the general health of the patient. The vaginal method of hysterectomy is followed in all possible cases by the author as being the safest and most natural method. After a careful discussion concerning the technique of the abdominal and vaginal methods and the conditions in which each should be employed, the article ends with a warning that too much importance should not be placed on the statistics of operations in these cases, as the question of personal equation has much to do with the results.

*Jour. Amer. Med. Assn., July 22, 1899.

†Berl. klin. Wochenschrift, July 3, 1899.

SURGERY.

Intestinal Anastomosis.—J. H. BARBAT,* from a series of experiments on dogs, reached the following conclusions on this question: (1) It is possible to make a safe and satisfactory end-to-end anastomosis. (2) With practice, a surgeon can, with nothing but a needle and thread, sew a divided bowel together, and obtain a result which will about equal that obtained by the use of the Murphy button. (3) The result obtained by the Murphy button is superior to that of any suture method yet devised. (4) The Murphy button and Frank coupler give the same anatomic result. (5) Contraction following end-to-end anastomosis is usually due to faulty technique. (6) The Murphy button is much safer and more reliable than

*Jour. Am. M. A., July 15, 1899.

the Frank coupler. (7) A perfect Murphy button, properly introduced, is the quickest, safest and most reliable means of obtaining anastomosis between any two viscera. (8) All devices which are used to support the gut in suture operations are unnecessary, and as good, if not better, results may be obtained without them.

Best Methods in the Treatment of Appendicitis.—R. T. MORRIS* briefly reviews some of the bad methods of treatment, and in the order of their importance places them as follows: Various medical means; the use of iodoform gauze packing; gauze packing without iodoform; extensive and multiple incisions; protracted operation; leaving adherent appendices; protecting the peritoneum. It is much better to work rapidly through a small incision; let pus flow as freely as it will over the peritoneum, and blow it out from time to time with hydrogen dioxide. Most of his operations are done through the inch-and-a-half incision. He believes that the greatest wrong is done to society by writers and speakers on the subject who have not taken the opportunities that are available for becoming properly informed, and who have little hesitation in expressing crude and dangerous opinions. Six examples of such harmful and injurious influence are quoted and discussed.

Shock in Modern Surgery. — G. F. SHRADY.† The conclusions on this question are that precious time is sacrificed to unnecessary detail. The present requisite seems to be that surgeons shall operate more quickly. Ordinarily there is no concern for exhaustion from hemorrhage, as the greatest care is always taken to seize the vessels the instant they are severed; but with nerve injury the effect is not so immediate generally as to force it upon the attention of the operator. The direful effects of prolonged operations and certain positions of the patient during operation are often manifest, not only in the appalling suddenness of collapse, but in the proportionate length of time that proper reaction is delayed. Quick reaction follows quick operation; and the longer the operation, the longer is the reaction delayed. It is also to be remembered that prolonged administration of an anesthetic is a means of shock in itself.

Some Observations on the Early Use of Purgatives After Abdominal Section. — O. G. RAMSAY,‡ from observations made on a series of cases, draws the following conclusions: (1) It is important to attend carefully to the diet and to the thorough emptying of the bowel before any abdominal operation. (2) The bowels should be moved and the distention relieved soon after operation, both for the comfort of the patient and to avoid possible dangerous complications. (3) In the simpler groups of operations, and in uncomplicated hysterectomies, the administration of calomel and enemata on the second day is followed by a perfectly satisfactory convalescence. (4) In cases of beginning peritonitis, in cases where numerous adhesions have been broken up or large raw areas left, where the intestines have been freely handled or left exposed, and in emergency operations where no previous preparations can be made, Dr. Byford's method of immediate purgation is indicated. This consists in the administration of drachm-doses of Epsom salts hourly as soon as the patient recovers from the anesthetic; after the sixth dose a small glycerin and warm water enema is given; salts are continued after this every hour, with enema every three hours, until the bowels move and flatus passes spontaneously.

*Jour. Am. M. A., July 15, 1899.
†N. Y. Med. Rec., July 22, 1899.
‡Am. Jour. of Obstet., July, 1899.

HYGIENE AND BACTERIOLOGY.

Further Notes on a Case of Malta Fever; a Study in Serum Diagnosis.—J. H. MUSSER and J. SAILER* make a further report regarding a case of what they considered as Malta fever, reported in December; at that time typhoid fever, malaria, tuberculosis and endocarditis had been excluded. Since then the patient had diarrhea; some of the stools, usually greenish-yellow in color, were passed involuntarily, and there was one intestinal hemorrhage. The abdomen became tympanitic, and an erythematous and papular eruption developed over the trunk. At no time could the Widal-reaction be secured, and the diazo-reaction was invariably absent. Agglutination was secured repeatedly with cultures of micrococcus melitensis, but never with typhoid bacilli. They believe that the clinical history and the presence of the serum-reaction confirm the diagnosis.

Sero-therapy—Report of 106 Cases of Tuberculosis Treated During 1898. — C. P. AMBLER† presents a tabulated report of 106 cases of pulmonary tuberculosis treated by the injection of serum; he attributes the results obtained to these factors, viz.: strict supervison of the patient as regards his hygienic life, favorable and climatic influences, and, finally, medical treatment. The best results, after a few months trial of serum from three sources, proved that Fisch's antiphthisic serum, T. R., gave the best results. After eighteen month's observation the conclusion has been reached that while serotherapy for tuberculosis in general is still in an experimental stage the results obtained from its use in the incipient cases certainly justify one in its continued use. He believes that it still occupies third place in the treatment of pulmonary tuberculosis, general hygiene and favorable climate being of more importance.

*Phila. Med. Jour., July 8, 1899.
†Jour. Am. Med. Assn., July 8, 1899.

Practical Therapeutics.

Lanolin as an Agent in the Reduction of Enlarged Glands.—A. C. FRICKENHAUS* reports the rapid reduction in size of enlarged glands after inunction with lanolin. The axillary glands were enlarged and painful, following recurring furunculosis of the trunk, and thorough application of lanolin over the enlarged glands was followed by diminution in their size and marked lessening of pain. Similar results were obtained in a case of angina tonsillaris, accompanied by enlargement of the tonsils and pain on swallowing.

Anemia.—As a consequence of mumps, DR. DAVID L. FIELD, of Jeffersonville, Ind., writes concerning several cases of anemia in children who had suffered from mumps. In these children there was no orchitis, or translation of the disease to any other organ, but the cases were attended with extreme languor and high temperature range. Nothing in the usual iron remedies gave relief for the anemia which followed upon these cases, and Dr. Field put them upon Henry's tri-chlorides remedy, a remedy which has never disappointed him in the treatment of anemia, from any cause. In these children the remedy proved most happy, and very prompt, in doses of one-half to one teaspoonful in water or milk after meals:

An Ointment for Hemorrhoids. — An ointment for hemorrhoids is composed of:

Compound tincture of camphor	1 drachm
Camphor	1 drachm
Belladonna ointment	15 drachms

Varicose Ulcers.—CARL BECK uses a gelatine zinc cast in the treatment of varicose ulcers. The composition of the paste is as follows:

Zinc oxide	20 parts
Gelatin	80 parts
Glycerin	200 parts

Water added to make 200 parts.

Quality vs. Price.—Commenting on an advertisement in a recent issue of the *Retrospect*, the editor writes: "A fact that is frequently overlooked, viz., that where a difference may exist in two remedies, as regards price, with apparently identical formulæ, there may also be a difference in quality. A manufacturer charging a fair price for a preparation can undoubtedly better afford to give it more attention and use a better quality of drugs than one who under-sells to such an extent as must necessarily jeopardize the quality of the remedy supplied. In medicine, as in any other commercial line, it is often advisable to pay the better price and get the better article. For instance, the original pill may contain one grain of a certain drug and an imitation of apparently the same formula contain one grain of the same named drug, yet the drug in the original may be pure and more active and cost considerably more than the cheaper imitation. It is a mistake to simply compare formulæ, and imagine one make as good as another, buy the cheaper one. The only criterion of therapeutic value is the actual therapeutic effect. A pill made with a view to subsequent price-cutting is not as reliable a remedy as a pill of the same formula during the manufacture of which no expense is spared. A physician will often prescribe a certain remedy, specifying a certain make, and be non-plussed at the patient not improving when the remedy he indicates has many times previously given him satisfactory results in similar cases. The cause frequently lines in the fact that he has gotten a preparation possibly bearing similar title and formula, but which has been compounded with a view to under-selling the original and successful remedy. And the result from getting the cheaper remedy cannot be otherwise than unsatisfactory. It is to be deplored that when a manufacturer originates a successful remedy imitations immediately spring up. The only claim that these imitations offer is price. We never heard of an imitation hoisting the standard of superiority. Trading upon the reputation built up by the original, it competes by quoting prices that often should cause physicians to think twice before using the imitation, and should they decide on the latter and be disappointed in the therapeutical effect, then the original should be prescribed before condemning the preparation. Disappointment in therapeutical effect may often mean that a patient suffers through non-effect of an indicated remedy, may even sacrifice life. Therefore, it is also advisable to specify the best and be sure of getting the anticipated effects of all remedies that may be prescribed. Let physicians, by specification, demonstrate their approval of remedies bearing the stamp of superiority, rather than by a false economy accept a cheaper substitute.—"*In medicina qualitas prima est.*"

Treatment of Pneumonia.—In a symposium on the treatment of this affection, at the Columbus meeting of the American Medical Association, H. A. HARE emphasized the fact that "when called to care for a patient through an attack of illness, the physician should be a watchman all the time and a therapeutist only when necessity arises." He said that in no disease does the welfare of the patient depend more upon the skill, ability, bearing, and discretion of the physician than in pneumonia, and that nothing is more fallacious than that such cases can be treated by any routine method. The curse of therapeutics to-day is the fact that physicians do not think for themselves, but blindly follow some method seemingly valuable, so that the personal equation of the individual is lost in the sum total of the disease. No one plan can invariably be followed, for the physician is not treating a disease, but an individual afflicted with an infection which will vary in its effects according to his susceptibility and the virulence of the involving organism.

*Monatshefte für Prakt. Dermatol., June 1, 1899.